

II. Response to Double Patenting Rejections

A. U.S. App. Ser. No. 10/123,113 (US 2002/0192463)

Claims 14 and 15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 13 and 14 of copending Application No. 10/123,113 (US 2002/0192463).

B. U.S. App. Ser. No. 10/404,861 (US 2003/0203193)

Claims 1-7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 10/404,861 (US 2003/0203193).

C. U.S. App. Ser. No. 10/415,948 (US 2004/0038020)

Claims 1-7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of copending Application No. 10/415,948 (US 2004/0038020).

Applicants respectfully defer responding to the provisional obviousness-type double patenting rejections.

III. Response to Claim Rejections Under 35 U.S.C. § 102

Claims 1-7, 14 and 15 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Oshima et al (EP 1 033 393 A2).

Applicants traverse the rejection.

Applicants note that Ohshima et al was cited in the corresponding EP application, which has already been granted.

The present invention relates to a heat-peelable double-faced pressure-sensitive adhesive sheet which comprises a substrate (a), a heat-peelable pressure-sensitive adhesive layer (b) formed on one side of the substrate (a) and containing heat-expandable microspheres, and a pressure-sensitive adhesive layer (c) formed on the other side of the substrate (a), wherein the heat peelable pressure-sensitive adhesive layer (b) and the substrate (a) are peelable from each other by heating.

In this connection it is submitted that the adhesive layer (b) of the adhesive sheet of the present invention may be formed by, for example, a method in which a mixture comprising heat-expandable microspheres and a pressure-sensitive adhesive is applied to the substrate (a). Alternatively, a method may be employed in which the mixture is applied to an appropriate separator to form the adhesive layer (b), which is then transferred to the substrate (a). Preferably, the side of the substrate (a) on which the adhesive layer is applied may have undergone a releasability-imparting treatment prior to the application of the adhesive layer (specification page 6, lines 22 to 24). This results in the formation of an adhesive sheet in accordance with claim 1 of the present invention, which comprises an adhesive layer (b) and a substrate (a) which are peelable from each other by heating. Consequently, the adhesive layer and the substrate of the adhesive sheet are separated from each other by heating.

On the other hand, Ohshima et al discloses a heat-peelable pressure-sensitive adhesive sheet comprising a substrate, a heat-expandable layer containing heat-expandable

microspheres, and a non-heat-expandable pressure-sensitive adhesive layer formed on at least one face thereof (claims 1 and 2). The adhesive sheet of Ohshima et al can efficiently be adhered to an adherend and then be peeled therefrom after heating (page 5, lines 9 to 14). The heat-expandable layer can be provided on one or both sides of the substrate, and the substrate can also be embedded in the heat-expandable layer (page 5, lines 34-35).

However, Ohshima et al does not disclose that the pressure-sensitive adhesive layer containing heat-expandable microspheres and the substrate are peelable from each other by heating. Again, the adhesive sheet of Oshima et al is peeled from an adherend as a whole. Therefore, Oshima et al does not disclose, all elements of the present claims and cannot be said to anticipate the present invention.

In addition, the present invention is not rendered obvious by Ohshima et al. Conventionally, adhesive sheets obtained by forming a pressure-sensitive adhesive layer containing a heat-expandable blowing agent on a substrate have been known as adhesive sheets for use in a method which comprises adhesively fixing a process material, such as a semiconductor wafer or layer build capacitor, to an adhesive sheet through its pressure-sensitive adhesive layer, grinding or cutting the process material into a given size, and then separating the process material from the adhesive sheet to recover it.

The pressure-sensitive adhesive layer is foamed or expanded by heating to reduce its adhesive force. However, since there are cases where a finely particulate residue, resulting from cohesive failure of the pressure-sensitive adhesive and attributable to foaming, is

transferred to the adherend upon peeling, the use of this pressure-sensitive adhesive sheet for adherends required to have high cleanness must be avoided.

Hence, there is a desire for an adherend-processing method by which even a fragile adherent can be easily transported and processed, and which enables the adherend after the processing to be clean.

The double-faced pressure-sensitive adhesive sheet in accordance with the present invention has satisfactory adhesiveness to an adherend, can be easily peeled off by heating at any desired time, and is effective in preventing the adherent from being fouled after separation therefrom. Even when the adherent is a particular fragile process material, such as a semiconductor wafer, the adhesive sheet of the present invention can impart excellent processability and transportability thereto. More specifically, the adherent can be easily transported together with the pressure-sensitive sheet adherent thereto.

As may be seen from the examples in accordance with the present invention, the heat-peelable double-faced pressure-sensitive adhesive sheet was adhered to a semiconductor silicon wafer and a glass wafer. The surface of the semiconductor silicon wafer was then ground with a back grinder, and subsequently the glass wafer was separated by heating and separating the adhesive layer (b) from the substrate (a) attached to the silicon wafer. Thereafter, a mount peeler was used to separate the semiconductor wafer.

As may be seen from Table 1, the silicon wafer grindability, the glass wafer peelability and the silicon wafer peelability were all evaluated as being good. By contrast, with the adhesive tapes of Comparative Examples 1 and 2, which do not comprise a pressure-sensitive

adhesive layer (b) being peelable from the substrate (1), the silicon wafer grindability was evaluated as being good, but the adhesive sheet could not be separated from the glass wafer.

Thus, the pressure-sensitive adhesive sheets according to the present invention are satisfactory in wafer grindability, in silicon wafer grinding, and are also satisfactory in peelability in separation of the semiconductor silicon wafer from the heat-peelable, pressure-sensitive adhesive sheet. The silicon wafer is moreover separated without being damaged.

It was therefore the objective problem underlying the present invention to provide an adhesive sheet which, when adhered to a fragile adherend, imparts excellent processability and transportability thereto and can be easily peeled off when desired, and which is further effective in inhibiting or preventing the adherent from being foul upon separation therefrom. It was further the objective problem to provide a method of processing an adherend, using said adhesive sheet. The problem is solved by the adhesive sheet of present claim 1 and the method of present claim 8.

The solution as provided by the present invention was however not obvious from Oshima et al. Oshima et al does not disclose or even suggest an adhesive sheet as defined in present claim 1, wherein a heat-peelable pressure-sensitive layer (b) containing heat-expandable microspheres and a substrate (a) are peelable from each other by heating, or any of the above-mentioned advantages thereof.

In view of the above, the present invention is not anticipated, nor rendered obvious by the disclosure of Oshima et al.

Accordingly, Applicants respectfully request withdrawal of the §102 rejection.

RESPONSE UNDER 37 C.F.R. § 1.111
Appl. No. 10/810,700

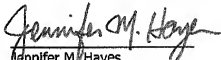
Atty. Docket No. Q80631

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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